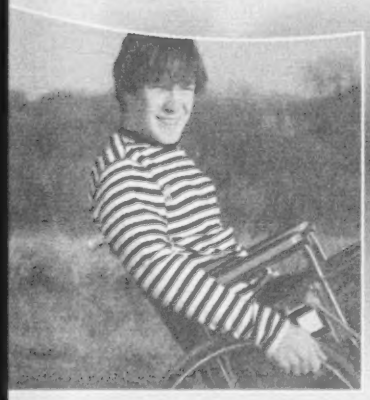
Environment Canada Environnement Canada

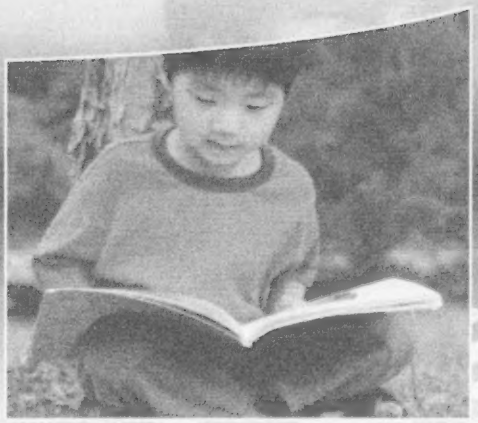
Air Quality Health Index

Classroom Kit – Grades 5 and 6

BOOK I: HEALTH

Learning stations to explore weather and health in today's world





Canada

Acknowledgements:

Project Management: Thera Ip (Environmental Program Officer; Air Quality Forecasting Program)

Update: Chantal Duhaime (Outreach Officer; Health and Air Quality Forecast Services)

A special thanks is extended to the teachers throughout Canada who reviewed the *Air Quality Health Index Learning Stations*. Appreciation is expressed to Ian Khan, Meteorologist at Environment Canada Atlantic, Halifax, N.S., for his technical expertise.

Cat. No.: En84-105/1-2014E-PDF
ISBN: 978-1-100-23259-1

Unless otherwise specified, you may not reproduce materials in this publication, in whole or in part, for the purposes of commercial redistribution without prior written permission from Environment Canada's copyright administrator. To obtain permission to reproduce Government of Canada materials for commercial purposes, apply for Crown Copyright Clearance by contacting:

Environment Canada
Inquiry Centre
10 Wellington Street, 23rd Floor
Gatineau QC K1A 0H3
Telephone: 819-997-2800
Toll Free: 1-800-668-6767 (in Canada only)
Fax: 819-994-1412
TTY: 819-994-0736
Email: enviroinfo@ec.gc.ca

Photos: © iStock

© Her Majesty the Queen in Right of Canada, represented by the Minister of the Environment, 2014

Aussi disponible en français

Quick Reference Guide

Educators can choose from six 30-minute learning centres for their grade 5 or 6 students, building skills in literacy, communication, reflection, and problem-solving. Developed directly from provincial and territorial curriculum documents, topics include: ways to prepare for and predict various weather and/or air quality conditions, how media, peers and family affect decisions, outdoor safety, and environmental health issues.

Station	**1: Science in the News**	**2: Behind the Scenes: Canada's Next Top AQHI Model!**	**3: Jumping to Conclusions**	**4: Getting Ready for Work**	**5: Air Qualitopoly**	**6: Kids Know Best!**
Summary	Students read about science in the news and describe ways to respond to, prepare for, or choose outdoor activities for various weather conditions.	Students use weather and AQHI to make choices about how to prepare for different outdoor activities.	Students describe and predict local air quality conditions using real-time weather data. Then they write conclusions using a new twist to an old-fashioned fill-in-the-blanks.	Students use narrative to reflect on how they make decisions and communicate their personal, family, and community attitudes towards healthy lifestyles and safety.	Students use cooperative learning to design a board game on air quality and sun health.	Students identify and solve local environmental health issues by engaging in a collaborative, problem-solving cycle.
Page	6	10	17	22	26	33
Materials	• Highlighters (at least two colours)	• 3 hats or boxes • Digital camera • Clothing/gear • Equipment/tools • White paper • Markers/crayons • Computer	• Scissors • Tape or glue	• 2 or 3 dice	• Bristol board (1 per group) • Markers/crayons • Game pieces • Scissors • Glue/tape	**Optional:** • Additional resources with information to support each initiative.
Preparation	• Student Instructions • Handout 1 (1 per student) • Articles (1 per group)	• Student Instructions • Handout 2 (1 per student) • Weather condition hat cards (1 per group)	• Student Instructions • Handout 3A (1 per group or student) • Handout 3B (1 per group or student) • Bookmark website	• Student Instructions • Handout 4 (1 per student) • AQHI Health Message chart (1) • Data Sheet (1)	• Student Instructions • Handout 5 (1 per group) • Air Quality Impact Cards (1 per group)	• Student Instructions • Handout 6 (1 per group) • Fact Cards (1 set)
Curricular Theme	Outdoor Safety & Weather: Heat Exhaustion, Hypothermia, Wind, Air Quality	Appropriate Dress for Conditions; Importance of Forecasts	Describing and Predicting Weather; Recording & Interpreting Information	Healthy life-styles, Decision-making, Attitudes on Safety	Appropriate Clothing and Safety for Outdoor Conditions	Effects of Environment on Human Health; Community Action

Introductory Activity: Silent Fact or Fiction?

Summary

This energizer will grab students' attention and get them moving and ready for learning about the Air Quality Health Index. It is intended to get them interested and bring out misconceptions. If desired, the activity can be repeated as a review activity after students have completed the learning stations.

Before You Start

Explain to the class that they are going to do a Silent Fact or Fiction. One wall of the classroom is going to be labelled "Fact" and the other one is going to be "Fiction." Place an example on the overhead and/or read it aloud. Students must then move silently but quickly to the region of the room that they guess is the correct answer. The teacher can then reveal the truth before moving to the next one. It is best to avoid explanations at this point because students will learn more for themselves in the learning stations.

Adaptations

Teachers can adapt this activity to meet the exact needs of their classrooms. One example would be to choose a disruptive students to keep score, which may make them feel more a part of the activity. Teachers might also choose a student to record a noise score or take off points on the class score for any noises.

As a Review

If used as a review at the completion of the learning stations, teachers may choose to have each student write their name and a statement on a piece of paper, indicating in brackets if it is fact or fiction. Then, the teacher can draw these statements from a hat for the Silent Fact or Fiction. This would highlight residual misconceptions on an individual basis.

Facts

There is an Air Quality Health Index (AQHI) that is like the ultraviolet (UV) index, only it tells us about the health risk from air pollution for that day.

The AQHI is part of the forecast. (There is a maximum forecasted value for today, tonight and tomorrow.)

The AQHI is based on the risks of common air pollutants that harm human health.

A common air pollutant that harms human health is: dust (particulate matter).

Air pollution makes asthma symptoms worse.

Air pollution is a problem throughout the seasons.

A full bus takes 40 to 60 cars off the road.

Running your gas-powered lawnmower for one hour is equal to driving a new car between 320 and 480 kilometres.

Some people are more sensitive to air pollution.

The shape of the land can allow pollutants to be trapped in basins and valleys.

High UV radiation makes more ground-level ozone, which is a pollutant.

For high UV you cover up and add sunscreen; for high AQHI you change your plans.

Fiction

For the AQHI, the lower the number, the greater the health risk associated with the air quality. (An AQHI of 2 is worse than an AQHI of 10.)

...Fiction Continued

A common air pollutant that harms human health is: oxygen.

Blue is used to show a very high health risk from air quality.

Air pollution is an issue for cities. People who live in rural areas are not affected.

Children are the least sensitive to the adverse health effects of air pollution.

Strong winds allow pollutants to build up over an area.

Weather does not affect air quality.

The AQHI in >your location< today is >insert value<. The AQHI in >more urban area< is >insert a false high value<. (*Note*: Choose values that highlight misconceptions about regional differences in AQHI).

References

Almarode, J. and Almarode, D. (2008). Energizing Students: Maximizing student attention and engagement in the science classroom. *The Science Teacher*, 75(9), 32-35.

Air Quality Health Index (AQHI) Website
www.airhealth.ca

Introductory Activity: Silent Fact or Fiction? – Overhead

Fact or Fiction?

1 There is an AQHI that is like the UV index, only it tells us about the health risk from air pollution for that day.

2 Air pollution is an issue for cities. People who live in rural areas are not affected.

3 The AQHI is based on the risks of common air pollutants that harm human health.

4 A common air pollutant that harms human health is: dust.

5 The AQHI is part of the forecast.

6 Air pollution makes asthma symptoms worse.

7 For AQHI, the lower the number, the greater the health risk associated with the air quality. (An AQHI of 2 is worse than an AQHI of 10.)

8 A common air pollutant that harms human health is: oxygen.

9 Weather does not affect air quality.

10 For high UV you cover up and add sunscreen; for high AQHI you change your plans.

11 Children are the least sensitive to the adverse health effects of air pollution.

12 The AQHI in_____today is ___. The AQHI in _____ is _____.

13 High UV radiation makes more ground-level ozone, which is a pollutant.

14 The shape of the land can allow pollutants to be trapped in basins and valleys.

15 Strong winds allow pollutants to build up over an area.

16 Running your gas-powered lawnmower for 1 hour is equal to driving a new car between 320 and 480 kilometres.

17 Some people are more sensitive to air pollution.

18 Blue is used to show a very high health risk from air quality.

19 Air pollution is a problem throughout the seasons.

20 A full bus takes 40 to 60 cars off the road.

Answers:
1. Fact 2. Fiction 3. Fact 4. Fact 5. Fact 6. Fact
7. Fiction 8. Fiction 9. Fiction 10. Fact 11. Fiction
12. Fiction (See Notes) 13. Fact 14. Fact
15. Fiction 16. Fact 17. Fact 18. Fiction 19. Fact
20. Fact

Tips: How to Use Learning Stations

How to Set Up the Stations

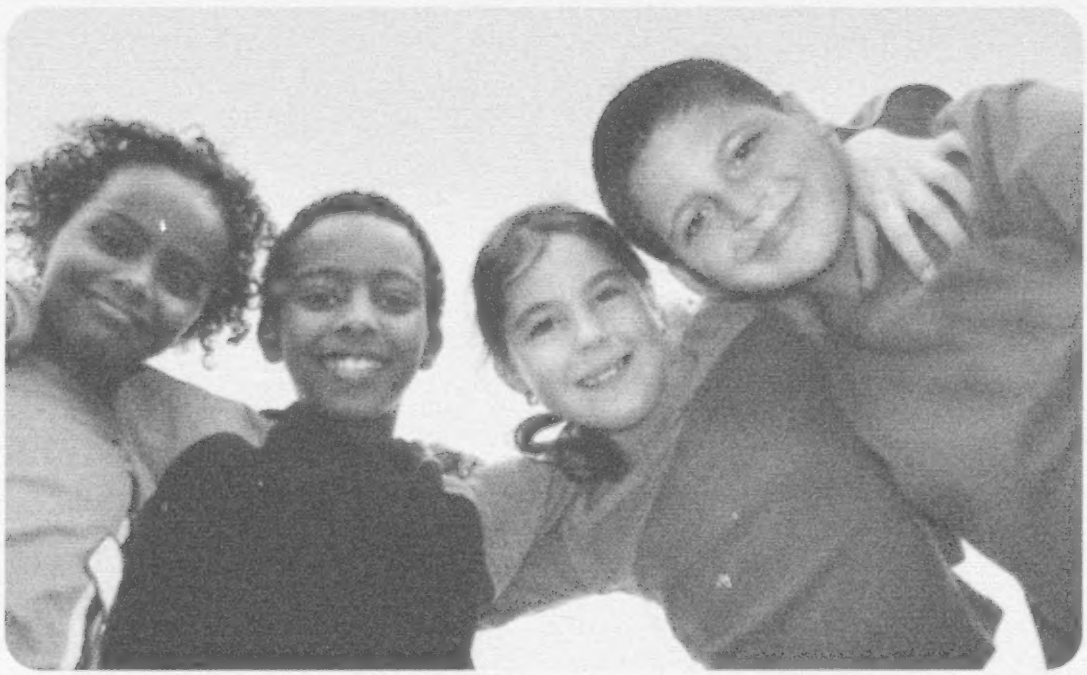
Set up six stations in your classroom where students can form groups. Place the Student Instructions and copies of the Student Handouts at each station.

Assessment Summary

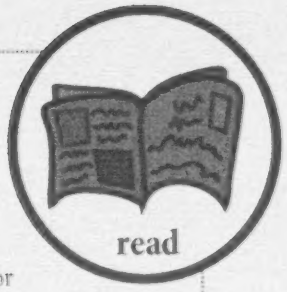
The independent nature of the learning stations will allow the teacher to circulate throughout the space to provide input and ongoing assessment of student progress.

For evaluation purposes, handouts are provided in each station and a summary score sheet is provided at the end of this document.

A peer evaluation of group interaction and collaboration is also provided at the end of this chapter.



Station 1: Science in the News



Summary

Students read about science in the news and reflect upon their reading practices. They describe ways to respond to, prepare for, or choose outdoor activities for various conditions.

Real-World Connection

Connects science to everyday events in the news and teaches strategies for science literacy.

Curriculum Themes

A complete set of provincial and territorial curriculum links can be found at the end of the stations.

- Describe ways to respond to, prepare for, choose outdoor activities for various weather conditions.
- Identify safety precautions for activities and preventing ailments (e.g., effects of UV rays, hot sunny weather can lead to heat exhaustion and sunburn, cold weather and high wind-chill factors increase risk of hypothermia and frostbite, high AQHI can lead to respiratory problems).

Materials

- Highlighters (at least two colours)

Preparation

- Student Instructions (1)
- Student Handout 1 (1 per student)
- Print one (1) copy per group of each of the following articles and place them at the station. The articles have been selected to provide a large variation in the level of reading difficulty and length to provide a challenge to all students.

Heat Exhaustion

CBCnews.ca. Study could help firefighters keep their cool. December 17, 2003.
www.cbc.ca/news/canada/study-could-help-firefighters-keep-their-cool-1.380210

CBCnews.ca. Doggy joggers: Tips for taking Rover on your run. August 28, 2008.
www.cbc.ca/news/technology/doggy-joggers-tips-for-taking-rover-on-your-run-1.711022

Hypothermia/Frostbite

CBCnews.ca. How to avoid a wintertime injury. December 30, 2008.
www.cbc.ca/news/technology/how-to-avoid-a-wintertime-injury-1.726394

CBCnews.ca. Study says don't count too much on long-range forecasts. July 5, 2002.
www.cbc.ca/news/technology/study-says-don-t-count-too-much-on-long-range-forecasts-1.316695

Wind

CBCnews.ca. Winnipeg deep freeze as cold as uninhabited planet. January 1, 2014.
www.cbc.ca/news/canada/manitoba/winnipeg-deep-freeze-as-cold-as-uninhabited-planet-1.2479967

CBCnews.ca. Calgary chinook study shows no link between weather, stroke. July 12, 2002.
www.cbc.ca/news/technology/calgary-chinook-study-shows-no-link-between-weather-stroke-1.317349

Air Quality

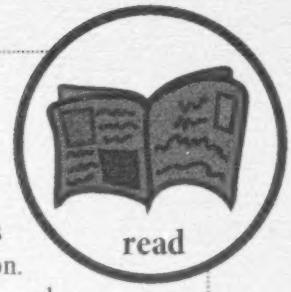
CBCnews.ca. New air quality index measures health risk. July 13, 2011.
www.cbc.ca/news/canada/calgary/new-air-quality-index-measures-health-risk-1.1110608

CBCnews.ca. Traffic pollution makes asthma symptoms worse in children: study. November 13, 2008.
www.cbc.ca/news/technology/traffic-pollution-makes-asthma-symptoms-worse-in-children-study-1.699661

Additional References

Creech, J. and Hale, G. 2006. Literacy in Science: A Natural Fit. Promoting student literacy through inquiry. The Science Teacher. 73(2): 22 - 27.

Station 1: Student Instructions



NEWS

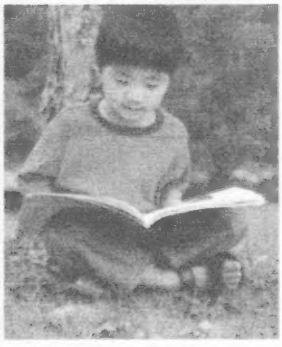
HEAT

AQHI

AIR QUALITY

COLD

LITERACY



1 There are a variety of news articles for you at this station. Choose a different article for each group member.

2 Complete the handout, talking with each other about your work. How will you figure out the answers? What words or clues in the articles help you find what you are looking for?

3 Share the safety tips for different conditions with the other members of your group.

Station 1: Student Handout

1 After you read the news story, fill in the boxes:

I read...	I thought...
I was confused by...	**This reminded me of...**

2 Is your news story based on scientific research? (Circle the answer) Yes / No

3 How can you tell?

4 Highlight the main idea or conclusion of your news story. What clues did you use to find it?

5 In a different colour, highlight the safety tips given. Did the safety tips make sense? Why or why not?

6 On the back of this sheet, draw an important part of the news story. How did you choose what to draw?

7 What question would you ask the researcher or expert from this article?

Station 2: Behind the Scenes: Canada's Next Top AQHI Model!

Summary

Students use weather information and the AQHI to make choices about how to prepare for different outdoor activities.

Real-World Connection

Planning for different activities in consideration of weather and air quality conditions.

Curriculum Themes

A complete set of provincial and territorial curriculum links can be found at the end of the stations.

Choose appropriate clothing to meet particular weather challenges and give reasons for appropriate dress.

Appreciate how important it is to be able to forecast weather and to have suitable clothing or shelter to endure various types of weather.

Materials

- 3 hats or boxes to put folded paper
- Digital camera
- A bag of clothing/gear and equipment/tools such as umbrellas, a snow shovel, large brim hats, sun screen, gardening tools, etc.
- White construction paper
- Markers, crayons and other colouring pens
- Computer for making slide show

Preparation

- Student Instructions (1)
- Student Handout 2 (1 per student)
- Weather condition hat cards (1 set per group)

Follow Up

When each group has finished the station and taken their pictures, ensure that they are all transferred to a computer so that each group can prepare their own Air Quality Health Slide Show.

References

Air Quality Health Index (AQHI) Website
www.airhealth.ca

Station 2: Student Instructions

What kind of outdoor activities do you like to do? Soccer? Hiking? Hide and seek? Do you prepare for all these activities in the same way?

You don't need the same clothing or equipment for all outdoor activities. Some reasons for this are because:

- some activities require specific clothes, like uniforms, soccer boots or bike helmets;
- some activities are best done when there is snow, like skiing or sledding;
- others are best done when there is wind, such as flying kites or sailing;
- most activities can't be done safely when there is thunder or lightning, but can take place if there is only rain, such as baseball, fishing, or hiking.

In this learning centre, you are going to make some decisions about what is the best clothing or equipment for different activities. You will need to think about the weather and air quality conditions.

1 Decide what activity you would like to explore and write it on your Student Handout. Make sure each group member selects a different activity.

2 Take turns picking a piece of paper out of each of the four hats at the learning centre (Raining and pouring!, Where's the wind?, How hot is hot?, and AQHI).

3 Record the information on the Student Handout. Then find your AQHI value on the table to see what health messages you need to consider.

4 *Each group member:* Decide if you want to be a designer, model, sketch artist, or photographer. Everyone can be a sketch artist if you don't have access to clothing/gear.

Designers:

From the bag provided, choose clothing/gear and equipment/tools that are best suited for the activity. Work with one of the models to put on the gear.

Photographers:

Take action shots of the models doing each activity (that is, if the AQHI and weather allow)! If not, work with the model to strike a pose and change their expression to show that the activity has to be cancelled. When you're done, transfer the pictures to a computer.

Models:

You are now Canada's Next Top AQHI Model for your activity. Work with the designer and photographer by trying on clothes and striking a pose! Based on the AQHI and weather conditions, strike a pose or change your expression to show whether or not you could go ahead with the activity.

Sketch Artists:

Sketch a "Canada's Next Top AQHI Model" for your activity. The picture must include a name for the model, the type of activity, all appropriate items of clothing in the colour that best reflects the AQHI reading for the day. Be sure that the pose and face shows us whether or not the activity will be called off or go ahead for the AQHI and weather conditions.

5 As a group, create an Air Quality Health slideshow on the computer.

AQHI and Outdoor Activities

1	2	3	4	5	6	7	8	9	10	+
Risk:	Low			Moderate			High			Very High

Health Risk	AQHI	Health Messages	
		At Risk Population	General Population
Low	1–3	Enjoy your usual outdoor activities.	Ideal air quality for outdoor activities.
Moderate	4–6	Consider reducing or rescheduling strenuous activities outdoor if you are experiencing symptoms.	No need to modify your usual outdoor activities unless you experience symptoms such as coughing or throat irritation.
High	7–10	Reduce or reschedule strenuous activities outdoors. Children and the elderly should also take it easy.	Consider reducing or rescheduling strenuous activities outdoors if you experience symptoms such as coughing and throat irritation.
Very High	Above 10	Avoid strenuous activities outdoors. Children and the elderly should also avoid outdoor physical exertion.	Reduce or reschedule strenuous activities outdoors, especially if you experience symptoms such as coughing and throat irritation.

Station 2: Weather Condition Hat Cards

Cut up the following chits of paper and place them into a container or hat.

How much rain? (Precipitation)

Sunny	A mix of sun and cloud	Cloudy periods
Showers	Cloudy with sunny periods	50% chance of showers
70% chance of showers	Showers with thunderstorms	40% chance of showers with a risk of thunder showers
Sunny	Sunny	Cloudy with a 60% chance of showers

Where's the wind? (Wind speed)

15 km/h	6 km/h	25 km/h
4 km/h	2 km/h	17 km/h
9 km/h	11 km/h	13 km/h
21 km/h	3 km/h	Calm

How hot is hot? (Temperature)

27˚C	18˚C	-20˚C
22˚C	10˚C	2˚C
17˚C	21˚C	19˚C
-10˚C	30˚C	0˚C

AQHI

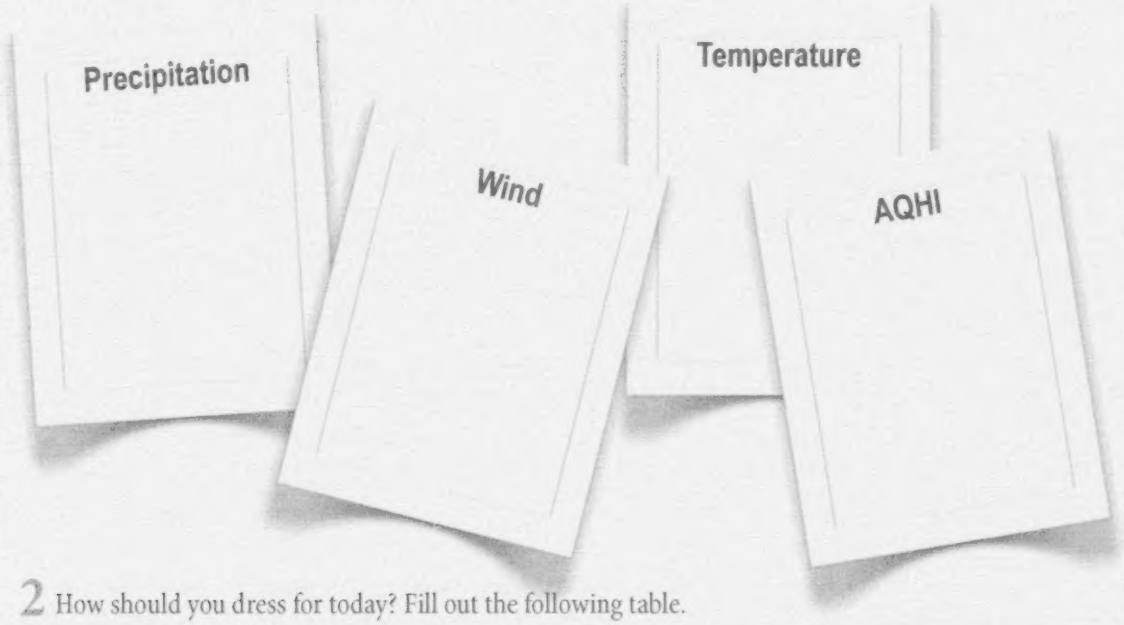
1	2	3
4	5	6
7	8	9
10+		

Station 2: Student Handout

Name:_____ Date:_____

Activity:_____

1 Complete the following table with the information from your cards.



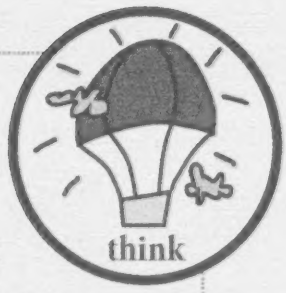
2 How should you dress for today? Fill out the following table.

On my...	Head	Upper body	Legs	Feet	Other
I will wear...					
Because...					

3 What should you bring with you?

4 Why is it important to be able to forecast weather?

Station 3: Jumping to Conclusions



Summary

Students describe and predict local air quality conditions using real-time weather data. Then, they are introduced to writing conclusions and the language of science using a modern, research-based twist to a sentence completion task.

Real-World Connection

Collecting data in real-life contexts

Using evidence to develop predictions and explanations

Curriculum Themes

A complete set of provincial and territorial curriculum links can be found at the end of the stations.

- Describe and predict local weather conditions
- Gather information about weather conditions for various regions of Canada
- Strategies for recording, using, and interpreting information
- Use a variety of observational techniques and tools

Materials

- Scissors
- Tape or glue
- Preparation
- Student Instructions (1)
- Student Handout 3A (1 per group or 1 per student)
- Student Handout 3B (1 per group or 1 per student)
- Bookmark the following website on the in-class browser:

Environment Canada Weather website:
www.weather.gc.ca

References

Air Quality Health Index (AQHI) website
www.airhealth.ca

Berber-Jiménez, L., Montelongo, J., Hernandez, A., Herter, R., and D. Hosking. (2008). Helping students write better conclusions. The Science Teacher, 75(3), 56-61.

Canadian Lung Association. Pollution & air quality. www.lung.ca

CBCNews.ca. No indoor tanning for children: study. April 24, 2003
www.cbc.ca/news/story/2003/04/24/tanteens_030424.html

Khan, Ian. (Personal communication with Environment Canada meteorologist. June 12, 2009).

The UV Index & Your Local Forecast. Health Canada. http://www.healthycanadians.gc.ca/environment-environnement/sun-soleil/index-uv-indice-eng.php

Answers

Fill in the blanks.

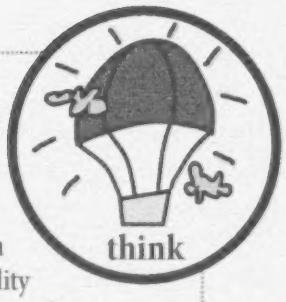
1. Animals	5. tanning	8. recorded
2. careers	6. Temperature	9. prepare
3. time	7. not	10. UV
4. AQHI		

Sentences to include in final conclusion and their correct order :

9. The link between cloud cover and air quality, UV, and temperature was explored to find out if people can look at the sky to prepare for going outdoors.

8. Different dates were picked and the cloud cover, AQHI, UV, and temperature were recorded.

3. AQHI, UV, and temperature went up and down over time.



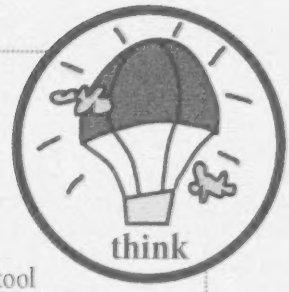
6. Temperature was highest on sunny days, but it was also sometimes cold on sunny days.

10. UV was highest on sunny days but was still above 3 (moderate) on cloudy days.

4. AQHI was low or moderate on some cloudy days and some sunny days. There were hazy, sunny days with a very high AQHI.

7. Looking at the sky is not a good way to predict the air quality or the temperature. It does help predict UV, but the UV index is still needed to prepare for cloudy days.

Station 3: Student Instructions



1 To complete Student Handout 3A, read the following background information on two health and weather tools:

Air Quality Health Index

The Air Quality Health Index (AQHI) is a tool that helps Canadians protect their health from air pollution. It assigns a number and a colour that helps people know the health risk that air pollution poses that day. To get the number, scientists measure toxic gases and dust in the air. The higher the number, the greater the risk from air pollution, and the greater the need to change your activities.

UV Index

The ultraviolet (UV) index is a tool that helps Canadians protect their skin from the strength of the sun's UV rays. It also assigns a number that helps people better understand the health risk from too much sunshine. To get the number, scientists measure the location, cloud cover, and precipitation (e.g., rain, snow). The higher the number, the stronger the UV rays, and the greater the need to protect yourself.

2 In a browser, load the Environment Canada Weather website at:

www.weather.gc.ca

3 Click on your province or territory or click your closest location on the weather map.

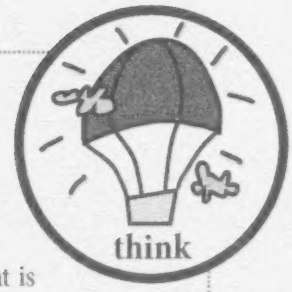
4 Complete Handout 3A.

5 Handout 3B will help you write better conclusions. First choose the correct vocabulary word to complete each sentence. The sentences are scrambled (they are not in order).

6 Cut out the sentences and sort them into ones that belong and ones that do not.

7 Unscramble the related sentences and rearrange them to make sense using tape or glue. They will make a conclusion about what you can tell about air quality, temperature, and UV from looking at the sky.

Station 3: Student Handout 3A



Write your ideas here.

1 Record the current conditions in your community and in one city in Canada that is not near your community.

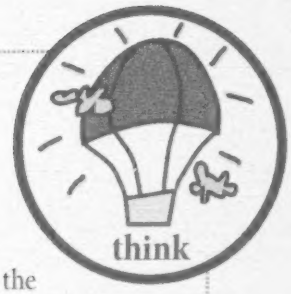
Item	My Community	Distant Canadian City
Date		
Time		
Sunny or cloudy? (check one)	☐ Sunny ☐ Mainly sunny ☐ Partly cloudy ☐ Mostly cloudy ☐ Cloudy	☐ Sunny ☐ Mainly sunny ☐ Partly cloudy ☐ Mostly cloudy ☐ Cloudy
Temperature		
Air Quality Health Index*		
UV		

**The AQHI is available for selected communities. More locations will be implemented across Canada. Visit the site often for updates on the new locations.*

2 In one colour, highlight any similarities between the two locations.

3 If you were travelling to that distant city today for a walking tour, how would you prepare?

Station 3: Student Handout 3B



Write your ideas here.

1 Follow the student instruction sheet and use the graphs to help write and arrange the conclusion.

animals	recorded	not	prepare	UV
temperature	time	tanning	careers	AQHI

1. _____ are affected by the full moon.

2. There are many interesting_____for men and women that connect health and science.

3. AQHI, UV, and temperature went up and down over_____.

4._____was high on some cloudy days and some sunny days.

5. Indoor_____ beds can more than double your risk of skin cancer.

6._____was highest on sunny days, but it was also sometimes cold on sunny days.

7. Looking at the sky is_____a good way to predict the air quality or the temperature. It does help predict UV, but the UV index is still needed to prepare for cloudy days.

8. Different dates were picked and the cloud cover, AQHI, UV, and temperature were _____.

9. The link between cloud cover and air quality, UV, and temperature was explored to find out if people can look at the sky to_____for outdoors.

10. _____was highest on sunny days but was still above 3 (moderate) on cloudy days.

2 Now, cut out each sentence and sort them into ones that belong and ones that do not.

3 Then, unscramble the related sentences and put them in order using tape or glue. Read the final conclusion over when you are finished.

Station 4: Getting Ready for Work!

Summary

Students use narrative to reflect on how they make decisions and communicate their personal, family, and community attitudes towards healthy lifestyles and safety.

Real-World Connection

Begin to think about and explore potential careers.

Consider how air quality and weather affect an individual's daily life choices.

Curricular Themes

A complete set of provincial and territorial curriculum links can be found at the end of the stations.

- Identify factors that influence attitudes and decisions regarding healthy lifestyles (e.g., media, family, peers).
- Reflect on and communicate personal, family, and community attitudes towards safety.

Materials

- Die

Preparation

- Student Instructions (1 per station)
- Student Handout 4 (1 per student)
- AQHI Health Message chart (1)
- Data Sheet (1)

Station 4: Student Instructions

Do you know what you want to be when you grow up? Any idea where you would like to live? In this activity, you will explore some different career choices in different parts of Canada, and then consider how the air quality in that city might affect your job and your life.

1 Look at the table below. There are four (4) categories (Careers, Community, Age, Health, and AQHI). In each category, there are six options. Each player will take turns rolling the die to see what they get for each category.

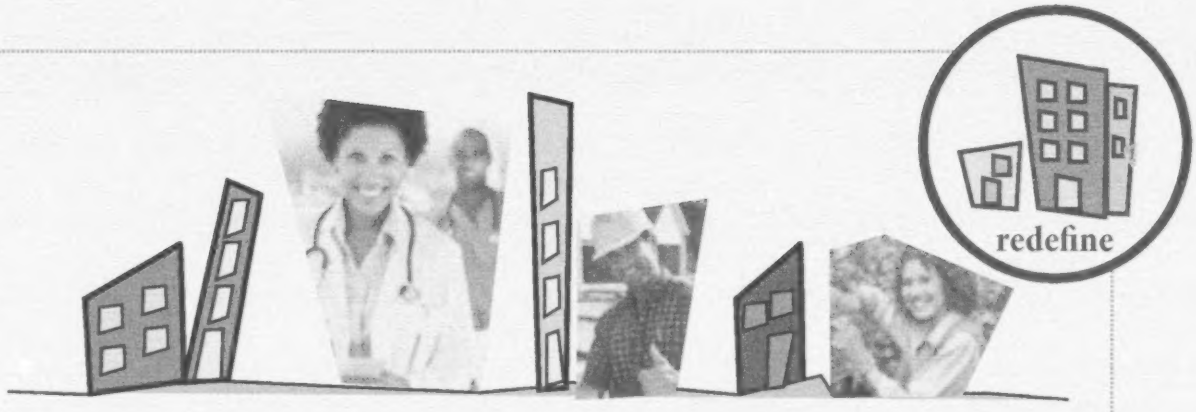
2 Start with the Career category. Roll the die and select the matching option. For example, if you roll a 3, then you are a teacher. If you roll a 6, you are a doctor specializing in asthma patients. Record the career on your Student Handout Sheet.

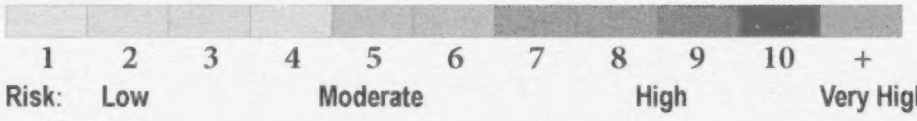
3 Take turns rolling the die for the Community category. Record your city on the Student Handout. If you roll a 2, then you live in Sydney, Nova Scotia. If you roll a 5, you live in Trois-Rivières, Québec, etc.

4 Continue with each of the categories, with each person rolling the die and recording their results on their Student Handout Sheet. Now, every person has a career, a city to live in, a relative age, understands any health problems they may have, and knows what the AQHI is for that day.

5 Complete the Student Handout. You will be giving tips to a rookie on the job about how you prepare for your day. Use the AQHI Health Message chart to learn a bit more about how the air quality affects your choices.

Roll	Careers	Community	Age	Health	AQHI
1	Construction worker	Windsor, Ontario	20–40 years	Healthy	1
2	Professional soccer player	Sydney, Nova Scotia	20–40 years	Healthy	2–3
3	Teacher	North Vancouver, British Columbia	40–50 years	You have a cold and sore throat	4–5
4	Landscaper	Winnipeg, Manitoba	40–50 years	You have mild asthma	6–7
5	Day care specialist	Trois-Rivières, Québec	50–70 years	You have severe asthma	8–9
6	Doctor specializing in asthma patients	Fort McMurray, Alberta	50–70 years	You have a mild heart condition	10+





Health Risk	AQHI	Health Messages	
		At Risk Population	**General Population**
Low	1–3	Enjoy your usual outdoor activities.	Ideal air quality for outdoor activities.
Moderate	4–6	Consider reducing or rescheduling strenuous activities outdoor if you are experiencing symptoms.	No need to modify your usual outdoor activities unless you experience symptoms such as coughing or throat irritation.
High	7–10	Reduce or reschedule strenuous activities outdoors. Children and the elderly should also take it easy.	Consider reducing or rescheduling strenuous activities outdoors if you experience symptoms such as coughing and throat irritation.
Very High	Above 10	Avoid strenuous activities outdoors. Children and the elderly should also avoid outdoor physical exertion.	Reduce or reschedule strenuous activities outdoors, especially if you experience symptoms such as coughing and throat irritation.

Station 4: Student Handout

Name:

Career:

Community:

Age:

Health:

AQHI:

Write an email to the rookie, giving them tips about how to prepare for the job each morning and keep a healthy lifestyle and safe workplace.

Include: preparations, clothes/gear, air quality, weather.

Help the rookie make the right choices by telling them who influences your decisions (e.g., media, family, peers).

New Message

Subject:

Hello_____

_____

_____

Some of the things I do in my job are_____

_____

_____

_____

_____

The weather and the air quality affect my job quite easily because_____

_____

_____

_____

_____

_____

So, when I get up in the morning, I prepare for my day by _____

_____

_____

_____

_____

I try to make the right choices for a healthy lifestyle and safe workplace. Sometimes others influence my decisions. For example,_____

_____

_____

_____

_____

Station 5: Air Qualitopoly!

Summary

Students use cooperative learning to design a board game that will focus on air quality and sun health in Canada.

Real-World Connection

- Experience a design process.
- Consider the details in game design.
- Be exposed to a wide variety of air quality health impacts that may affect student decisions related to dressing, activity choices, and friends and family.

Curriculum Themes

A complete set of provincial and territorial curriculum links can be found at the end of the stations.

- Identify appropriate clothing and safety precautions for various outdoor activities and weather conditions.

Materials

- At least one large piece of construction paper, cardboard or bristol board to serve as a game board, per group
- A wide variety of markers, crayons, highlighters, pens, pencils and other writing/colouring tools for the game board designs
- A selection of random objects to serve as game pieces (such as crayons, pebbles, erasers, pennies, paper clips, etc.)
- Scissors
- Glue, tape and other craft supplies

Preparation

- Student Instructions (1)
- Student Handout 5 (1 per group)
- Air Quality Impact Cards (1 per group)

References

Dodge, B.J. (2003-09-22). Board Game Design First Steps. Retrieved April 04, 2009, from Exploratory Learning Through Educational Simulation & Games website: http://edweb.sdsu.edu/courses/edtec670/boardgame/boardgamedesign1.html

Lin, E. (2006). Cooperative Learning in the Science Classroom. The Science Teacher, 73(5), 34-39.

Station 5: Student Instructions

Do you know how to play the game *Monopoly™*? Your group is going to design an air quality and sun health board game like *Monopoly™*. You will consider how the AQHI can be used to make decisions about going outside, what sports or activities you do, and how air quality affects the health of you, your friends, and family.

You will need to work as a team to plan a few things that make a board game unique, such as how many spaces you need, what your game pieces will look like, and (of course) how you will win!

Each group is going to design its own game. You won't have a lot of time, so this version is just your first rough draft of your game. We call it a "mock-up." When the mock-ups are complete, each group will present to the class, and the class will vote on the one you like best. The entire class can then create a more permanent game and present it to the entire school.

Co-operative Roles

Reader (Reads the instructions)

Task manager (Makes sure members fulfill their roles)

Illustrator (Sketches group ideas)

Timekeeper (Keeps the group on-task so it finishes in time)

Materials manager (Collects and manages materials for the group)

Presenter (Presents group ideas to the class)

START

Select a large piece of construction paper or cardboard and use that as your game board.

Decide how you will lay out the spaces for the game (e.g., Around the edge? In a circle?) Be as creative as you want!

Decide where the ***Start*** and ***Finish*** of the game will be and mark them on the game board.

Find the sheet with the cards. Cut them out and stack them. As a group, use the blank squares to create at least five (5) new impacts that you can add to your game. Add the cards to your stack, mix them up and place them on the board.

Choose 3 or 4 special spaces. Decide what you want to happen when someone lands there. They may have to: sing a song, miss a turn, not talk for one minute, etc. Don't forget to write it on the space!

Select game pieces from whatever you have available in the classroom (e.g., chalk, pencils, pennies, or whatever you can find).

Decide how to start the game. Will it be the person whose birthday is closest or whoever rolls the highest number on the dice?

Pick a name for your game. The winner of the game will be the players who makes it around the board first, after learning about air quality and sun health from the Impact Cards he or she has drawn, so the name has to reflect air quality health in some way.

Teacher Notes:

Get ready to present your game to the rest of the class by filling in the Student Handout Sheet.

FINISH

Station 5: Student Handout

1 What is the name of your game? (Make sure the name has something about air quality in it!) _____

2 What is the objective of your game? (How do you win the game?) _____

3 What materials do you need in order to play the game? (game pieces? dice? what else?)

4 How long do you think it will take to play your game? (15 minutes? 30 minutes? If you're not sure, what is another board game that you know that probably lasts the same time?)

5 What are the rules for your game? _____

6 How will you decide who will start the game?

7 How many turns can a player take in a row?

8 When does a player pick up an Impact Card? After each roll, or just when he or she lands on a certain space? _____

9 Do you use two dice or just one? _____

10 Do you play individually or in partners?

Station 5: Air Quality Impact Cards

The AQHI is 6 in your community.

Move back 2 spaces to wait for better air quality.

It is a very sunny day and you applied sun screen 30 minutes before going outdoors.

Move forward 3 spaces!

You have learned how to use the AQHI!

Congratulations!

Move forward 2 spaces.

The AQHI is 4 in your community, but you have asthma so you are at risk if you play outdoors.

Move back 1 space to represent staying indoors for the day.

You were planning on going cycling with your grandparents, but you need to reschedule because your grandmother has a cough and the AQHI is 7. Move back 2 spaces.

You have a soccer game today and the AQHI is 8! The soccer club decides to wait until the AQHI goes down to 3.

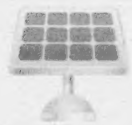
Move back 1 space.

The AQHI is 2, and you have another soccer game.

Move forward 2 spaces because risk is low!

There is a strong, toxic odour in the air.

Move back 1 space.

You convince your principal to have the AQHI reading included as part of the morning school announcements. Move forward 3 spaces!	Your class and teacher work together to create a YouTube video about air quality in your community. Move forward 3 spaces!	
You and your class organize an air quality awareness presentation for the entire school! Move forward 3 spaces.	You and your family go to the beach and forget the sunscreen. Move back 2 spaces.	Congratulations, you choose to ride your bike to school instead of driving, to help improve air quality. Move ahead 2 spaces.
You encourage your teacher to check the AQHI before your class goes outside for recess. Move forward 2 spaces!		

choose

Station 6: Kids Know Best!

Summary

Students identify and solve local environmental health issues by engaging in a collaborative, problem-solving cycle.

Real-World Connection

- Gives a true sense of the process and issues that come up when solving real problems in a community.
- Encourages reflection on the people and factors involved in real-life issues.

Curriculum Themes

A complete set of provincial and territorial curriculum links can be found at the end of the stations.

- Assess the effects of environmental factors on human health.
- Propose ways in which individuals can reduce the harmful effects of these factors and take advantage of those that are beneficial.

Materials

Optional: Additional resources with information on communities who have tried and/or data to support the fact cards.

Preparation

- Student Instructions (1)
- Student Handout 6 (1 per group)
- Fact Cards (1 set):
  1. Idling and anti-idling laws
  2. Using fans instead of air conditioning
  3. Slowing down (drive 20% slower)
  4. Walk or bike instead of driving
  5. Using public transportation instead of car

Set-up: There are two ways to set this up. One is to have each group that arrives at the station start from scratch with the materials provided. The other is to have each newly arriving group pick up where the last group left off, bringing the class as a whole closer to a final solution. Both methods will work for you.

References

Canadian Lung Association. Pollution & air quality. www.lung.ca

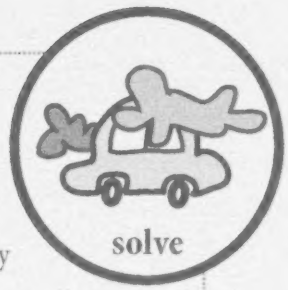
Fay, G. (2006). Using a Cycle to Find Solutions. The Science Teacher 73(8), 44-47.

Nielsen, Mark. Bus rides free on bad air days. March 3, 2009. Prince George Citizen. www.princegeorgecitizen.com

CTV News. Few kids walk to school anymore, study finds. December 3, 2008. http://www.ctvnews.ca/few-kids-walk-to-school-anymore-study-finds-1.348386

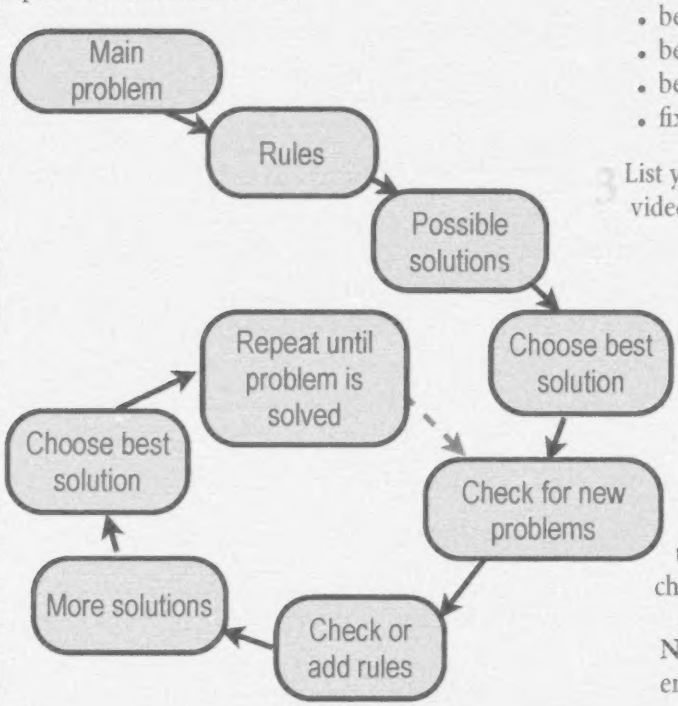
Skywatchers Guide to Weather Supplement One: Air Quality. Environment Canada.

Station 6: Student Instructions



Something is wrong, and you are going to come up with a solution. A real one that deals with your school, your town, you. It's a problem-solving cycle that you can use for anything from large community projects to convincing your parents to let you go to a movie.

The cycle keeps going until you really solve the problem. It looks like this:



1 The problem.

The gym teacher is noticing poor air quality outside during lunchtime intermural sports. Some of the children are coughing and wheezing, and even the teacher's eyes are burning. To sum it up, local traffic and industry are causing air pollution in the school yard.

2 You make the rules.

When we do things, we all have some rules to follow. When you are a child, adults give you new rules for almost every thing you do, like you can go outside but you need to put on sunscreen. Or, you can get a dog but you have to take it for a walk every day.

You need to choose what rules you need to make for solving this problem. Some ideas for rules are that the solution has to:

- be safe,
- be legal,
- be fast,
- be cheap,
- fix the pollution.

3 List your rules across the top of the table provided on your handout.

4 Possible solutions...

Kids can come up with great solutions that adults might not even think about. As a group, think of possible solutions to the problem and list four of them in the table under "solution". We have made a list of possibilities to get you started but please feel free to use your own. You will get another chance to do this again later.

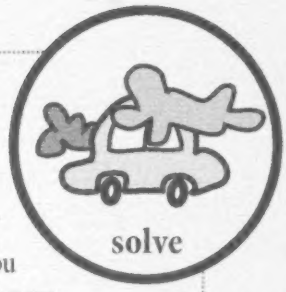
No idling: No-idling laws for when parents pick up and drop off students.

Use fans: Reduce how much fuel we burn by turning off air conditioning and using fans in school and in the car.

Slow down: Drive 20% slower, including buses and parents.

Walk or bike: Walk or bike to school instead of driving.

Take the bus: Use public transit to get to school.



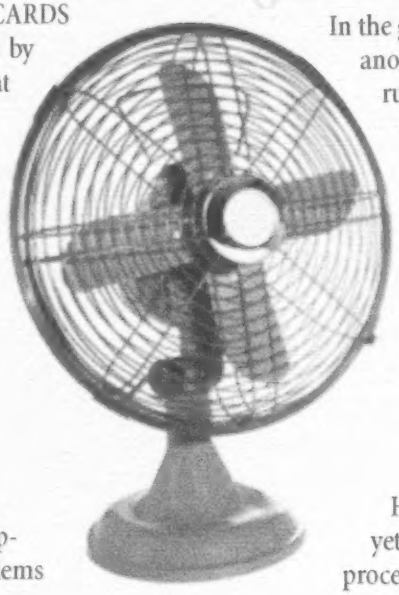
5 Pick one solution each and become an expert about it. Use the FACT CARDS and additional materials provided by your teacher to learn about that topic. Then give it a plus (+), minus (-), or neutral (0) to show if the solution follows the rules.

6 **Choose the best solution.**

Draw a star beside it or highlight it on the table.

7 **Brainstorm new problems.**

Now you have the best solution, but the problem is not solved. There are new problems. How will you really make this happen? Brainstorm the new problems you have and choose at least one.

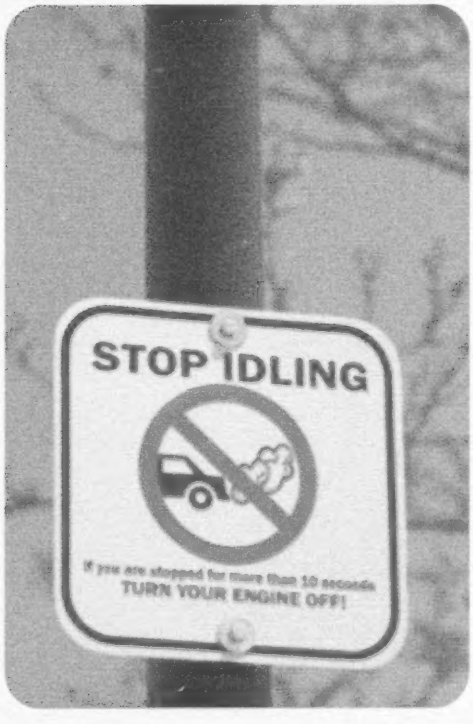


8 **Check or add rules.**

In the group, make another list of rules before you come up with new solutions. Consider making rules for your own school that consider your school's location and who needs to participate. Some rules might be the same as before.

9 **List solutions and choose the best one.**

Have you solved the problem yet? If you have time, repeat the process again until you do.



Station 6: Fact Cards

No idling

Idling for more than 10 seconds uses more fuel than restarting your engine. Most cars and trucks require only 15 to 30 seconds of idling before being driven, even in winter. 45 seconds of idling uses roughly the same amount of fuel as driving a kilometre.

At least 50 towns east of Quebec have anti-idling laws, and these laws are planned for western cities such as Victoria, B.C. In Kentville, N.S., a maximum of 3 minutes of idling is allowed.

www.drivewiser.ca
www.ec.gc.ca/meteoaloeil-skywatchers/

Use fans

Save fuel by using air conditioning only when needed in vehicles and buildings. Fans use much less energy.

Roll down the windows when driving in the city. On the highway, close the windows and use fans or a lighter setting of air conditioning.

You use 3–5% more energy for every degree your air conditioner is set below 27°C.

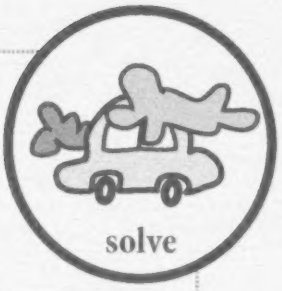
www.energystar.gov
www.wikihow.com/Use-Window-Fans-for-Home-Cooling
www.drivewiser.ca
www.ec.gc.ca/meteoaloeil-skywatchers/

Slow down

You can use less fuel and make less pollution by driving slower. When on the highway, driving between 90 km/h and 100 km/h can reduce fuel consumption by up to 30%.

Also, avoiding quick starts and stops uses less fuel.

www.drivewiser.ca



Walk or bike

Say good-bye to gas! Swap gasoline-powered vehicles and other machinery, such as motorboats, motorbikes and gas lawnmowers, for human-powered versions like canoes and sailboats, bicycles, and electric or push lawnmowers.

In 1971, 80% of Canadian children aged seven and eight walked to school.

www.ec.gc.ca/meteoaloeil-skywatchers/

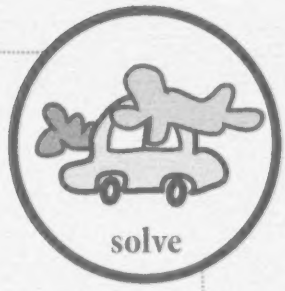
Take the bus

Use public transportation or car pool instead of using your car; after all, one busload of passengers saves nine tonnes of air pollution each year.

In Prince George, B.C., it is now free to take the bus on bad air days.

www.ec.gc.ca/meteoaloeil-skywatchers/

Station 6: Student Handout



1. List your rules across the top of the table.
2. List your four possible solutions along the side.
3. Read the fact sheets. Use a plus (+), minus (-), or neutral (0) in the following table to show if the solution follows your rules.

	Rules			
Solution				
A				
B				
C				
D				

4. Choose the best solution. Draw a star beside it or highlight it on the table.
5. We now have some new problems. Three (3) of the new problems are:

Problem 1 _____

_____

_____

Problem 2 _____

_____

_____

Problem 3 _____

_____

_____

6 Circle one of the new problems and repeat the problem-solving cycle to fill in a new table. Make up new rules and new solutions.

7 It's your turn to get information about your ideas for solutions. Then use a plus (+), minus (-), or neutral (0) in the boxes to show if the solution follows the rules.

	Rules			
Solution				
A				
B				
C				
D				

8 Choose the best solution. Draw a star beside it or highlight it on the table.

9 Use the following table to repeat the cycle again and get even closer to solving the problem!

	Rules			
Solution				
A				
B				
C				
D				

Background Information for Teachers

Air Quality, Smog, Pollution, and Our Health

What is air quality?

Air is made up of different gases (78% nitrogen, 21% oxygen, 0.09% argon, 0.03% carbon dioxide, and the remaining 0.07% is a mixture of water vapour and other trace components). Air quality describes the level of air pollutants in that air. Air pollutants can become dangerous to human health if people are sensitive to elevated levels of pollutants or are exposed to them for extended periods. To reduce risks, people need to know when pollutants are present and in what concentrations.

What is smog?

Most pollution that we know about is usually invisible, meaning we can't look at the air and determine how much pollution is in it. However, sometimes pollution concentrations can be so high that you can actually see it in the air. If you live in a large city, often, in the summer, the pollution in the form of smog can be seen hovering over the skyline. Smog, whether visible or invisible, is a mixture of different pollutants that can be seen as a brownish yellow or greyish white haze in the air. The two key components of smog are particulate matter and ground-level ozone.

What is particulate matter?

Sometimes very, very tiny solid or liquid particles are suspended in the air, and these are referred to as particulate matter. These include dust, dirt, soot, smoke, and tiny particles of chemical pollutants. This kind of particulate pollution comes from power plants, trash incinerators, motor vehicles, construction activities, forest, and natural dust blown around on the wind. In large cities where there are a lot of vehicles, the particulate matter can be worse than in rural areas.

What is ground-level ozone?

Ozone, like oxygen, is a colourless gas that cannot be seen in the air. High in the atmosphere, ozone forms a barrier to harmful solar radiation. Ground-level ozone, however, is formed from other pollutants already in the air when they mix with sunshine, and so ozone concentrations are normally higher in the summer. Ozone is harmful to people, animals, plants, and other materials.

How is air quality measured?

Environment Canada scientists assess air quality by collecting and analyzing air samples taken from near ground level. Pollutant levels are affected by such factors as emissions sources, weather conditions and topography. Environment Canada scientists have developed complex computer models that now provide air quality forecasts for major centres in Canada.

How does air pollution affect health?

Your lungs inhale all things in the air around you, including particulate matter and ground-level ozone. If you are sensitive to high pollution levels, you may experience symptoms that are unpleasant or even dangerous. How do you know if you are sensitive? People with diabetes, lung disease (such as

asthma, chronic bronchitis, emphysema, lung cancer) or heart disease (such as angina, a history of heart attacks, congestive heart failure, arrhythmia or irregular heartbeat) are more sensitive to air pollution than the average Canadian.

Seniors, too, are at higher risk because of weakening of the heart, lungs and immune system, and increased likelihood of health problems such as heart and lung disease.

Children are also more vulnerable to air pollution: they have less-developed respiratory and defense systems. Because of their size, they inhale more air per kilogram of body weight than adults. Children also spend more time outdoors being physically active, which can increase their exposure to air pollution.

Finally, people participating in sports or strenuous work outdoors breathe more deeply and rapidly, allowing more air pollution to enter their lungs. They may experience symptoms like eye, nose or throat irritation, cough, or difficulty breathing when air pollution levels are high.

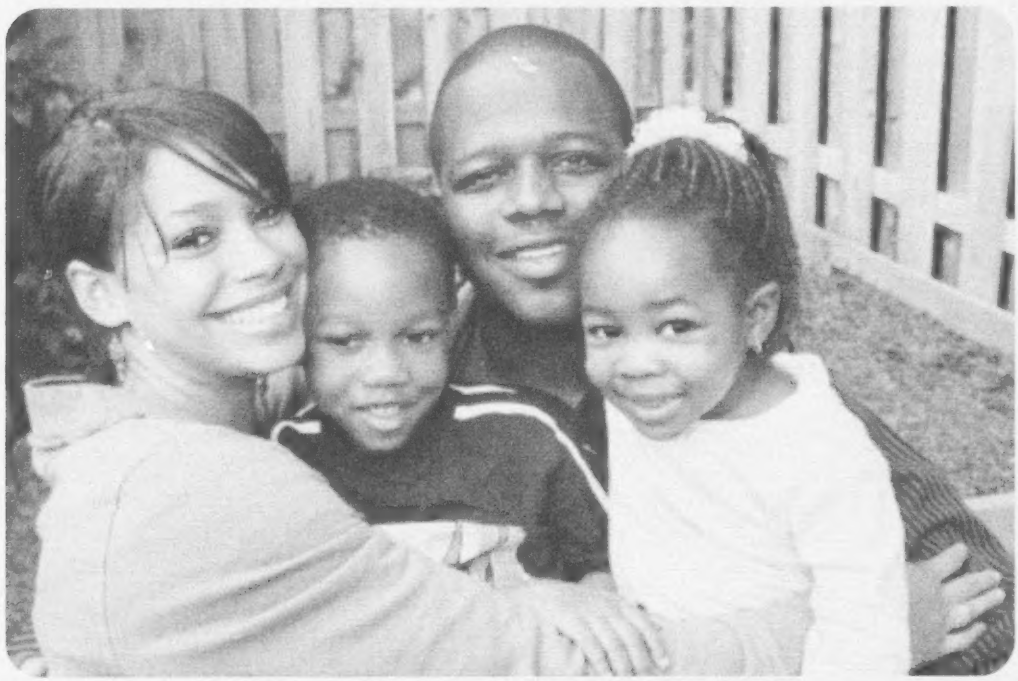
What is the Air Quality Health Index?

The Air Quality Health Index (AQHI) is a scale designed to help Canadians understand what the quality of the air around us means to our health. It is a new tool developed by health and environmental professionals to communicate the risk to health posed by air pollution. Everyone is affected by air pollution differently, so some of us are at a higher risk than others.

The AQHI is designed to help us make decisions to protect our health and the environment by:

- Limiting short-term exposure to air pollution
- Adjusting our activity during episodes of increased air pollution and encouraging physical activity on days when the index is lower
- Reducing our personal contribution to air pollution

The index provides specific advice for people who are especially vulnerable to the effects of air pollution as well as the general public.



The AQHI is measured on a scale ranging from 1 to 10+:

1–3 = "Low" health risk

4–6 = "Moderate" health risk

7–10 = "High" health risk

Above 10 = "Very high" health risk

AQHI and the weather

The greatest potential for high-risk AQHI days occurs when several weather conditions come together resulting in a deterioration of air quality.

Wind speed plays a role in diluting pollutants. Generally, strong winds disperse pollutants, whereas light winds generally result in stagnant conditions allowing pollutants to build up over an area.

Inversion or "stagnant" conditions are commonly associated with major air pollution episodes. Under normal conditions, the air near the surface is warmer. The warmer air rises and mixes with the cooler air above. This condition is known as "unstable". Inversions can develop when a warmer, less dense air mass moves over a cooler, denser air mass creating a temperature inversion where the air is now cooler closer to the surface. Pollutants are unable to mix vertically and will stay pooled near the ground due to these "stable" conditions. Inversions can persist for hours or days.

Topography can create conditions that allow the trapping of pollutants. At night, cold air tends to drain downhill, settling into low-lying basins and valleys. Unable to rise, the cool air settles and accumulates in these valleys, trapping air pollutants.

Long-range transport or transboundary transport of air pollution is a significant problem in Canada. Winds coming from the United States (south) and industrialized areas of Ontario and Quebec can result in higher levels of air pollutants in neighbouring Canadian cities.

Clear, cloudless skies allow more sunlight or UV radiation to penetrate the Earth's surface. Higher intensity of sunlight allows for more photochemical reactions to occur, producing high levels of ground-level ozone, which is one of the pollutants measured in the AQHI.

References

Environment Canada, (2006). Sky Watchers Guide to Weather. Toronto, ON: Environment Canada, Ontario Region. (Supplement 1, Air Pollution, Smog and Our Air Quality).

Environment Canada, (2008–08–18). Air Quality Health Index Frequently Asked Questions. Retrieved June 24, 2009, from Environment Canada, Air Quality Health Index (AQHI) website: www.ec.gc.ca/cas-aqhi/default.asp?lang=En&n=3E3FDF68-1

Grade 5 Curriculum Outcomes

Province	Health/Physical Education	Science
Alberta	**Wellness Choices:** • W-5.8 Promote safety practices in the school and community • W-5.9 Determine appropriate safety behaviours for community recreational situations; e.g., using snowmobiles, all-terrain vehicles	**Weather Watch:** • GLO 5–9 Investigate relationships between weather phenomena and human activity. • 12. Recognize that human actions can affect climate, and identify human actions that have been linked to the greenhouse effect. • 13. Appreciate how important it is to be able to forecast weather and to have suitable clothing or shelter to endure various types of weather. • 14. Test fabrics and clothing designs to choose those with characteristics that most effectively meet the challenges of particular weather conditions; e.g., water resistance, wind resistance, protection from cold.
British Columbia	**Health; Healthy Living; Goals and Decisions** • A1 Describe how various factors (e.g., access to accurate and relevant information, media and social influences) affect decision making **Health; Healthy Living;** • C1 Identify factors that influence attitudes and decisions regarding healthy lifestyles (e.g., family, peer, media) **Safety and Injury Prevention;** • C8 Describe how to remove or reduce hazards and risks for injury in a variety of settings, including on the road	• N/A

Province	Health/Physical Education	Science
Manitoba	**Safety; K.3.5.B.2** • Describe ways to respond appropriately to potentially dangerous situations related to environmental conditions (e.g., floods, fires, extreme weather conditions, icy conditions, lightning) relevant to self and others. **K.3.5.B.4** • Identify available community supports that promote safety and community health (e.g., helplines, dentists, doctors, nurses, police officers, social workers, security guards, lifeguards, natural healing modalities, physiotherapists, Block Parents)	**Weather** • 5-4-02 Describe how weather conditions may affect the activities of humans and other animals. GLO: D5 • 5-4-12 Describe examples of technological advances that have enabled humans to deepen their scientific understanding of weather and improve the accuracy of weather predictions. GLO: A2, A5, B1, D5
New Brunswick	• N/A	**Earth and Space Science; Weather** • 105-1 Identify examples of scientific questions and technological problems that are currently being studied • 106-4 Describe instances where scientific ideas and discoveries have led to new inventions and applications • 107-2 Describe and compare tools, techniques, and materials used by different people in their community and region to meet their needs • 107-5 Provide examples of how science and technology have been used to solve problems in their community and region **Social and Environmental Contexts of Science and Technology** • 205-8 Identify and use a variety of sources and technologies to gather pertinent information • 206-5 Draw a conclusion, based on evidence gathered through research and observation, that answers an initial question • 301.14 Describe and predict patterns of change in local weather conditions

Province	Health/Physical Education	Science
Newfoundland and Labrador	**Injury Prevention and Safety** • 6. Demonstrate safety practices related to outdoor activities such as camping and hiking • 8. Describe appropriate clothing for various activities and weather conditions	**Earth and Space Science; Weather** • 105-1 Identify examples of scientific questions and technological problems that are currently being studied • 106-4 Describe instances where scientific ideas and discoveries have led to new inventions and applications • 107-2 Describe and compare tools, techniques, and materials used by different people in their community and region to meet their needs • 107-5 Provide examples of how science and technology have been used to solve problems in their community and region • 205-8 Social and Environmental **Contexts of Science and Technology** • 205-8 Identify and use a variety of sources and technologies to gather pertinent information • 206-5 Draw a conclusion, based on evidence gathered through research and observation, that answers an initial question • 301-14 Describe and predict patterns of change in local weather conditions
Northwest Territories	• N/A	• N/A

Province	Health/Physical Education	Science
Nova Scotia	**Values and Practices for Healthy Living** • B3.2 Identify and practice outdoor safety precautions • C4.1 Demonstrate proactive strategies for enhancing the social and environmental health of the community	**Earth and Space Science; Weather** • 105-1 Identify examples of scientific questions and technological problems that are currently being studied • 106-4 Describe instances where scientific ideas and discoveries have led to new inventions and applications • 107-2 Describe and compare tools, techniques, and materials used by different people in their community and region to meet their needs • 107-5 Provide examples of how science and technology have been used to solve problems in their community and region • 205.8 Social and Environmental **Contexts of Science and Technology** • 205-8 Identify and use a variety of sources and technologies to gather pertinent information • 206-5 Draw a conclusion, based on evidence gathered through research and observation, that answers an initial question • 301.14 Describe and predict patterns of change in local weather conditions
Nunavut	• N/A	• N/A
Ontario	• N/A	**Relating science and technology to society and the environment;** • 1.1 Assess the effects of social and environmental factors on human health, and propose ways in which individuals can reduce the harmful effects of these factors and take advantage of those that are beneficial

Province	Health/Physical Education	Science
Prince Edward Island	• N/A	**Earth and Space Science; Weather** • 105-1 Identify examples of scientific questions and technological problems that are currently being studied • 106-4 Describe instances where scientific ideas and discoveries have led to new inventions and applications • 107-2 Describe and compare tools, techniques, and materials used by different people in their community and region to meet their needs • 107.5 Provide examples of how science and technology have been used to solve problems in their community and region **Social and Environmental Contexts of Science and Technology** • 205-8 Identify and use a variety of sources and technologies to gather pertinent information • 206-5 Draw a conclusion, based on evidence gathered through research and observation, that answers an initial question • 301.14 Describe and predict patterns of change in local weather conditions
Quebec	**Competency 3** • To adopt a healthy, active lifestyle; safe participation in physical activity; appropriate clothing	**Earth and Space; Systems and Interactions** • Meteorological systems (clouds, precipitation, storms) and climates **Technologies related to the earth, the atmosphere and outer space** • (Seismographs, prospection, weather forecasting, satellites, space stations) **Strategies;** • Strategies for recording, using and interpreting information; use a variety of observational techniques and tools
Saskatchewan	• N/A	**Physical Science: Weather (WE)** • WE5.3 (Indicator C) Analyze the impact of weather on society and the environment, including technologies that help humans address weather conditions.

Province	Health/Physical Education	Science
Yukon	**Health; Healthy Living; Goals and Decisions;** • A1 describe how various factors (e.g., access to accurate and relevant information, media and social influences) affect decision making **Health; Healthy Living;** • C1 identify factors that influence attitudes and decisions regarding healthy lifestyles (e.g., family, peer, media) **Safety and Injury Prevention;** • C8 describe how to remove or reduce hazards and risks for injury in a variety of settings, including on the road	• N/A

Grade 6 Curriculum Outcomes

Province	Health	Science
Alberta	• N/A	• N/A
British Columbia	**Health; Safety and Injury Prevention;** • C11 Describe responsible safety behaviours on the road and in the community	• N/A
Manitoba	**Safety** • K.3.6.A.2 Determine how environmental conditions can influence safety while exercising outdoors (e.g., effects of ultraviolet rays, hot sunny weather can lead to heat exhaustion and sunburn, cold weather and high wind-chill factors increase risk of hypothermia and frostbite.) • K.3.6.A.3 Recognize reasons (e.g., safety, personal hygiene, comfort, ease of movement.) for appropriate dress for physical activities in different weather and environmental conditions (e.g., sunny, cold, windy, wet.)	• N/A
New Brunswick	**Caring for Yourself, Your Family and Your Community** • A2 Identify and describe various environmental factors that affect our health **Personal Wellness** • B3 Identify how environments influence health choices	**Social and Environmental Contexts of Science and Technology** • 107-1 Describe examples, in the home and at school, of tools, techniques, and materials that can be used to respond to their needs

Province	Health	Science
Newfoundland and Labrador	**Injury Prevention and Safety,** • 5. Assess an area of the community for injury risk, i.e. home, school, recreational facility, neighbourhood or roadways • 6. Discuss the potential dangers of overexposure to the sun and the use of tanning machines **Environmental Health** • 4. Describe how natural and human-made changes in the environment may have negative as well as positive implications, • 6. Explain the greenhouse effect, the ozone layer, and pollution and the implications of these in terms of health	**Social and Environmental Contexts of Science and Technology** • 107-1 Describe examples, in the home and at school, of tools, techniques, and materials that can be used to respond to their needs
Northwest Territories	• N/A	• N/A
Nova Scotia	**Strategies for Healthy Living** • B4.1 Practice strategies for the prevention of skin cancer **Values and Practices for Healthy Living** • C4.1 Identify ways in which individuals, communities and countries cooperate to protect and maintain environmental health	**Social and Environmental Contexts of Science and Technology** • 107-1 Describe examples, in the home and at school, of tools, techniques, and materials that can be used to respond to their needs
Nunavut	• N/A	• N/A
Ontario	**Personal Safety and Injury Prevention** • Identify and describe appropriate methods for preventing and treating ailments (e.g., sunburn, minor cuts)	• N/A
Prince Edward Island	• N/A	**Social and Environmental Contexts of Science and Technology** • 107-1 Describe examples, in the home and at school, of tools, techniques, and materials that can be used to respond to their needs

Province	Health	Science
Quebec	**Competency 3** • To adopt a healthy, active lifestyle; safe participation in physical activity; appropriate clothing	**Earth and Space; Systems and Interactions;** • Meteorological systems (clouds, precipitation, storms) and climates **Technologies related to the earth, the atmosphere and outer space** • (Seismographs, prospection, weather forecasting, satellites, space stations) **Strategies;** • Strategies for recording, using and interpreting information; use a variety of observational techniques and tools
Saskatchewan	• USC 6.6 Develop and demonstrate the knowledge, skills, and personal standards necessary for establishing and supporting safe practices and environments related to various community activities. • a. Examine safety risks for common/ local adolescent activities (e.g., based on needs and interests of community). • b. Reflect on and communicate personal and family attitudes towards safety. • c. Represent a personalized, thoughtful, and coherent understanding of the importance of a healthy attitude toward personal safety.	• N/A
Yukon	**Health; Safety and Injury Prevention** • C11 Describe responsible safety behaviours on the road and in the community	• N/A

www.ec.gc.ca

Additional information can be obtained at:

Environment Canada
Inquiry Centre
10 Wellington Street, 23rd Floor
Gatineau QC K1A 0H3
Telephone: 1-800-668-6767 (in Canada only) or 819-997-2800
Fax: 819-994-1412
TTY: 819-994-0736
Email: enviroinfo@ec.gc.ca